

REMARKS

Claims 24-39 and 54-73 are currently pending in the present application, including independent claim 24 and 32. Independent claim 24, for example, is directed to a method for reducing odor. The method comprises mixing the salt of a transition metal with silica particles to form a transition metal / silica particle mixture; selectively adjusting the pH of the mixture to 7 or greater so that modified silica particles are formed that contain the silica particles and the transition metal. The modified silica particles are contacted with an odorous compound. The transition metal provides one or more active sites for capturing the odorous compound.

In the Office Action, independent claim 24 was rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,486,356 to Yim in view of U.S. Patent No. 5,380,510 to Matsui, et al. Yim is directed to a deodorant that comprises a carrier selected from a group consisting of silica gel, MgO, and talc, a transition metal oxide or alloy, and a catalytic metal adsorbed on the carrier. The deodorant is made by immersing a carrier formed of a silica gel and transition metal oxide or alloy into an aqueous catalytic metal complex solution (e.g., $\text{Pt}(\text{NH}_3)_4\text{Cl}_2$). In this manner, 0.2 to 1 wt.% of the catalytic metal is "adsorbed" on the carrier. (Col. 2, ll. 34-54).

As correctly noted by the Office Action, however, Yim fails to disclose certain limitations of independent claim 24. For example, Yim fails to disclose selectively adjusting the pH of the claimed transition metal / silica particle mixture to 7 or greater so that modified silica particles are formed. Nevertheless, the Office Action cites Matsui, et al. in combination with Yim in an attempt to render obvious independent claim 24.

The pH referred to by Matsui, et al. does not meet the claim limitation of independent claim 24 that includes “selectively adjusting the pH of said mixture to 7 or greater so that modified silica particles are formed that contain said silica particles and said transition metal.” The previous Amendment argued this point. However, the Office Action indicates that Applicant “appears to admit that both a mixture and the claimed pH are taught.” Applicant respectfully disagrees with this assertion, and the argument will be elaborated upon for clarification.

Matsui, et al. is directed to a method for making silica gels in the form of scales or needles. The method includes depositing a silica acid sol in gaps among faces of crystals of solvent of sol, which is crystallized by freezing the silica acid sol. This results in the formation of frozen silica hydrogels, which are then unfrozen, polymerized, and dried. (Col. 1, ll. 33-41). In the table in Col. 2 of Matsui, et al., it is disclosed that a pH of 9 could be utilized during gelation of a silica sol at normal temperatures. However, Matsui, et al. does not utilize “normal temperatures.” The table in Col. 2 appears to simply be some type of normal temperature gelation correlation for the specific type of sol (i.e., a “reactant sol” obtained through the reaction of silicic acid soda and sulfuric acid). Col. 1, ll. 55-57. It is simply a reference point as referred to later in the specification:

The storage time period, for which the frozen substances are left frozen depends on the concentration and pH value of the material silicic acid sol and the freezing temperature and condition, is selected from the range from several minutes to 24 hours, and needs to be longer than the gelation time period at normal temperature. Col. 2, ll. 57-63.

Actually, the reference point (i.e., correlation chart at normal temperatures) must not be a very accurate indicator of gelation time. As, Matsui, et al. further states:

Since the substances are frozen, however, the gelation temperature lowers and the gelation time period lengthens. Because of such contradiction the gelation time period cannot be defined clearly. Therefore, the frozen substances must be partially unfrozen to confirm that the gelation is substantially taking place. Col. 2, line 66 – Col. 3, line 3.

At any rate, the concentration/pH/gelation time correlation reference chart for a reactant sol obtained through the reaction of silicic acid soda and sulfuric acid of Matsui, et al. certainly does not remedy the deficiencies of Yim. Matsui, et al. in proper combination with Yim does not teach or suggest creating a transition metal/silica particle mixture, and selectively adjusting the pH of the mixture to 7 or greater to form modified silica particles containing silica particles and transition metal.

As disclosed in the present specification, modified silica particles formed by adjusting the pH to 7 or greater have stronger bonds (e.g., coordinate and covalent bonds) between the transition metal and silica particles. (pg. 8, line 8 – pg. 9, line 3). For instance, silica sols are generally considered stable at a pH of greater than about 7. The salts of transition metals are often acidic. Mixing such an acidic transition metal salt with a silica sol can lower the pH and cause the metal salt to precipitate on the surface of the particles. This may compromise the stability of the silica particles and reduce the number of silanol groups present on the surface of the silica particles. Because the transition metal may bind to these silanol groups, the capacity of the particles for the transition metal may be lowered at lower pH values. To ameliorate the pH-lowering effect caused by the addition of an acidic transition metal salt (e.g., copper chloride), independent claim 24 requires selective control over the pH of the silica particles / transition metal mixture.

Thus, the gelation time pH of Matsui, et al. bears no significance to the limitations of claim 24. The Office Action "picked" a pH of 9 disclosed by Matsui, et al. in a process wholly unrelated to the method claimed by Applicant in an attempt to achieve the limitations of claim 24 in a Section 103 combination. Again, claim 24 requires selectively adjusting the pH of the transition metal / silica particle mixture so that modified silica particles are formed that contain the silica particles and transition metal. Of course, this limitation in the method of claim 24 is entirely different than simply choosing a pH in order to control gelation time of a reactant sol obtained through the reaction of silicic acid soda and sulfuric acid as taught by Matsui, et al. The references have not been viewed in their entirety, and thus, a prima facie case for obviousness has not been met. MPEP § 2141.02.

Independent claim 32 was also rejected in the Office Action under 35 U.S.C. § 103(a) as being obvious over Yim. As correctly noted in the Office Action, Yim fails to disclose certain limitations of independent claim 32. For example, Yim fails to disclose coupling a transition metal to a surface of silica particles with an organofunctional silane so that modified silica particles are formed. Nevertheless, the Office Action cites Yu et al. (U.S. Patent No. 6,111,010) in combination with Yim in an attempt to render obvious independent claim 32. Yu, et al. is directed to an aqueous solution that contains the reaction product of a polyisocyanate and amino-functional alkoxysilane for use as a binder, adhesive, or sealant. The Office Action asserted that it would have been obvious to "use the aminofunctional alkoxysilane . . . in the silica production of Yim because Yu discloses the alkoxysilane in a process for making compositions comprising colloidal silica."

Applicant emphasizes that the silane utilized in Yu, et al. is used in binders for coating, adhesive or sealant compositions. Independent claim 32 requires “coupling a transition metal to a surface of silica particles with an organofunctional silane.” Again, the Office Action has merely “picked” a silane in an attempt to reach the limitations of claim 32. The Office Action completely ignores the function of the claimed organofunctional silane, i.e., to couple a transition metal to a surface of silica particles. It is improper to simply pick and choose just those components needed from a prior art reference to combine in a Section 103 combination.

The prior Amendment attempted to explain the ramifications of the claim language of coupling a transitional metal to a surface of silica particles with an organofunctional silane with a particular described embodiment (i.e., the formation of a coordinate bond between copper and an aminopropyltriethoxysilane coupling agent and a covalent bond between the coupling agent and silanol groups present on the silica particles). Unfortunately, the Office Action dismissed the entire argument by stating “Applicant does not claim the specified coordinate complex.” Applicant respectfully disagrees. The “specified coordinate complex” is encompassed by the claim language – specifically, “coupling a transition metal to a surface of silica particles with an organofunctional silane.” In that specific case, the copper (i.e., transition metal) is coupled to silanol groups present on the silica particles (i.e., silica particles) with aminopropyltriethoxysilane (i.e., an organofunctional silane). In this case the transition metal is coupled to the silica particles via a coordinate bond between the transition metal and the organofunctional silane and a covalent bond between the organofunctional silane and the silica particles.

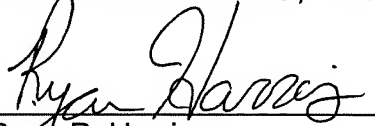
Thus, for at least the reasons set forth above, Applicant respectfully submits that independent claims 24 and 32 patentably define over the cited references. Further, at least for the reasons indicated above relating to corresponding independent claims 24 and 32, the corresponding dependent claims also patentably define over the references cited. However, the patentability of the dependent claims certainly does not hinge on the patentability of the independent claims. In particular, it is believed that some or all of these claims may possess features that are independently patentable, regardless of the patentability of the independent claims.

Applicant respectfully submits that the present application is in complete condition for allowance and favorable action, therefore, is respectfully requested. Examiner Johnson is invited and encouraged to telephone the undersigned, however, should any issues remain after consideration of this Response.

Please charge any additional fees required by this Response to Deposit Account No. 04-1403.

Respectfully requested,

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